

Application No.: 10/088,904
Reply to Office Action of: October 3, 2003
Amendment Dated: March 3, 2004

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Claim 1 (Currently Amended): A graft copolymer (G) which is prepared by emulsion graft polymerization of

a rubber polymer comprising ~~0-50~~ 1-40 % by weight of a butadiene unit and ~~50~~ 60-100% by weight of a (meth)acrylate unit, and

at least one monomer selected from the group consisting of an aromatic alkenyl compound, a methacrylate, an acrylate and a vinyl cyanide compound, said graft copolymer containing 0.5-2.0% by weight of an emulsifier residue.

Claim 2 (Original): A graft copolymer (G) according to claim 1, wherein said rubber polymer is a composite rubber polymer obtained by emulsion polymerization of a (meth)acrylate component using a graft-linking agent and a crosslinking agent in combination in the presence of a butadiene polymer having a weight-average particle diameter within a range of 200-500 nm.

Claim 3 (Original): A graft copolymer (G) according to claim 2, wherein said butadiene polymer is enlarged by an acid group-containing copolymer latex.

Claim 4 (Currently Amended): A graft copolymer (G) according to claim 1, wherein said emulsifier residue is an acid type acidic emulsifier having two or more functional groups in a molecule, or a salt thereof.

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Claim 5 (Currently Amended): A graft copolymer (G) according to claim 4, wherein said acid-type acidic emulsifier having two or more functional groups in a molecule, or a salt thereof, is alkenylsuccinic acid or a salt thereof.

Claim 6 (Original): A graft copolymer (G) according to claim 1, wherein a 1% weight loss temperature on the measurement of TG-DTA under the conditions of 20°C/minute is 300°C or higher.

Claim 7 (Original): A graft copolymer (G) according to claim 1, wherein the amount of particles having a particle diameter less than 100 nm contained in the rubber polymer is within a range of 1-30% by weight.

Claim 8 (Original): A graft copolymer (G) according to claim 1, wherein the weight-average particle diameter of said rubber polymer is within a range of 200-500 nm.

Claim 9 (Original): A graft copolymer (G) according to claim 8, wherein the weight-average particle diameter of said rubber polymer is within a range of 250-450 nm.

Claim 10 (Currently Amended): A method of preparing a graft copolymer (G), which comprises performing comprising:
emulsion graft polymerization polymerizing of
a rubber polymer comprising ~~0-50~~ 1-40% by weight of a butadiene unit and ~~50~~
60-100% by weight of a (meth)acrylate unit, and

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at least one monomer selected from the group consisting of an aromatic alkenyl compound, a methacrylate, an acrylate and a vinyl cyanide compound,
~~said method comprising the step of controlling the an amount of an emulsifier using~~
so that the an amount of an emulsifier a residue of said emulsifier in said graft copolymer is
within a range of 0.5-2.0% by weight, or
~~the step of controlling the conditions of a washing treatment of said graft copolymer,~~
to obtain a residue of said emulsifier in said graft copolymer of 0.5 to 2.0 % by weight.

Claim 11 (Currently Amended): A The method of preparing a graft copolymer (G) according to claim 10, wherein said emulsifier residue is an acid type emulsifier having two or more functional groups in a molecule, or a salt thereof.

Claim 12 (Currently Amended): A The method of preparing a graft copolymer (G) according to claim 11, wherein said emulsifier is an alkenylsuccinic acid or a salt thereof.

Claim 13 (Currently Amended): A thermoplastic resin composition, comprising:
1-100% by weight of the graft copolymer (G) of claim 1,
~~99-0% by weight of the other a second~~ graft copolymer (S) and/or ~~the other a second~~ thermoplastic resin composition (F);
wherein a total amount of (G) and (S) and/or (F) is (total of 100% by weight).

Claim 14 (Currently Amended): A The thermoplastic resin composition according to claim 13, wherein said ~~other second~~ thermoplastic resin (F) is at least one member selected from the group consisting of acrylic resin, acrylonitrile-styrene (AS) resin, acrylonitrile-

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styrene-N-substituted maleimide terpolymer, styrene-maleic anhydride copolymer, styrene-maleic anhydride-N-substituted maleimide terpolymer, acrylonitrile-styrene-(meth)acrylate terpolymer, polyolefin resin, polyvinyl chloride resin, polystyrene resin, polyamide resin, polyester resin, polycarbonate resin, polyphenylene ether resin, polyacetal resin, polyarylate resin, polyphenylene sulfide resin, polyether ether ketone resin (PEEK resin), and polyether sulfone resin (PES resin).

Claim 15 (Currently Amended): A The thermoplastic resin composition according to claim 13, wherein said ~~either~~second graft copolymer (S) is at least one member selected from the group consisting of ABS resin (S-1), ethylene-propylene-non-conjugated diene rubber graft copolymer (S-2) and polyorganosiloxane/(meth)acrylate composite rubber graft copolymer (S-3).

Claim 16 (Currently Amended): A The thermoplastic resin composition according to claim 13, further comprising:

5-40 parts by weight of a bromine flame retardant, and 0.1-20 parts by weight of an antimony compound, relative to 100 parts by weight of said thermoplastic resin composition.

Claim 17 (Currently Amended): A The thermoplastic resin composition according to claim 13, further comprising:

1-40 parts by weight of a phosphorous flame retardant and 0-20 parts by weight of a bromine flame retardant, relative to 100 parts by weight of said thermoplastic resin composition.

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Claim 18 (Currently Amended): A thermoplastic resin composition according to claim 13, further comprising:

0.0001-5 parts by weight of at least one auxiliary flame retardant selected from polytetrafluoroethylene, chlorinated polyethylene and silicone oil, based on 100 parts by weight of said thermoplastic resin composition.

Claim 19 (Currently Amended): A The thermoplastic resin composition according to claim 13, further comprising:

1-50 parts by weight of an inorganic filler, relative to 100 parts by weight of said thermoplastic resin composition.

Claim 20 (Original): A molded article which is prepared by molding said thermoplastic resin composition of claim 13.

Claim 21 (Original): A molded article according to claim 20, which is a housing for electric appliance or vehicle parts.

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BASIS FOR THE AMENDMENT

Claims 1 and 10 have been amended to require a rubber polymer comprising 1-40% by weight of a butadiene unit as supported at page 5, 4th paragraph, of the specification.

The remaining Claims have been amended in order to better conform to accepted U.S. claim format.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 1-21 will now be active in this application.

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INTERVIEW SUMMARY

Applicants wish to thank Examiner Asinovsky for the helpful and courteous discussion with Applicants' Representative on November 7, 2003. During this discussion it was noted that one way to overcome the rejections over Gallagher and Hongo et al is to require in Claims 1 and 10, a rubber polymer comprising 1-40% by weight of a butadiene unit as supported at page 5, 4th paragraph, of the specification. The Claims have been amended accordingly.

Gallagher discloses the use of butadiene (col. 3, line 40) in a copolymer with vinyl chloride (col. 3, lines 14-17). However, there is no rubber polymer comprising 1-40 wt% of a butadiene unit and a (meth)acrylate unit as required by the amended Claims.

Hongo et al disclose the use of a butadiene polymer comprising at least 50% by weight of butadiene (col. 3, lines 56-65) which is of course much higher than 40% by weight. Thus, the present invention could be distinguished from Hongo et al.